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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,664	02/05/2001	Paul Kevin Shufflebotham	015290-508	9320

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EXAMINER

ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 12/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/775,664

Applicant(s)

SHUFFLEBOTHAM ET AL.

Examiner

Rudy Zervigon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 50-53, 55-63 and 65-71 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 50-53, 55-63 and 65-71 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 50-53, 55-58, 60-62, and 65-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (U.S.Pat. 5,522,934). Suzuki et al teaches an PECVD (column 4, lines 5-18) ICP reactor (Fig.8) with a plasma processing chamber (4, Fig.8; column 3, lines 55-57). A ceramic (“anodized aluminum”; column 4, lines 19-25) substrate holder (6, Fig. 2, 8) is shown (column 4, lines 19-36) supporting a substrate (“W”) within the processing chamber with an electrode (18) buried within the ceramic material (6). An electrically-conductive planar coil (22, Figure 8) disposed outside the process chamber (column 12, lines 23-27) and connected to an RF energy source (32, Fig.8) for energizing the process gas into a plasma state. A process gas distribution system (54, Figure 11; column 10, lines 33-43) for gas introduction into the process chamber (4, Figure 8). The process gas distribution system comprising injectors (64B of 56B; Figure 8, 9, 11) with orifice (58B; Figure 9, 11) at least some of which direct the process gas along an axis that intersects the substrate at an acute angle, these same injectors being spaced outwardly from the periphery of the substrate (Figure 8, 11). Suzuki further teaches wafer temperature control means (column 4, lines 45-55; column 13, line 62 – column 14, line 4).  
Claims 51, 52, 53 – Suzuki additionally teaches silane (silicon-containing reactant gas) and oxygen as described in the specification (column 6, line 51). With regard to Suzuki not teaching phosphorous and boron containing gases - It has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a

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claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Claim 55 – Suzuki further teaches operating pressures of about 1mTorr (column 16, lines 38-44).

Claims 56, 66 - Suzuki further teaches a ceramic (“anodized aluminum”; column 4, lines 19-25) substrate holder (6, Fig. 2, 8) is shown (column 4, lines 19-36) supporting a substrate (“W”) within the processing chamber with an electrode (18) buried within the ceramic material (6).

Claim 57 - Suzuki further teaches a process gas distribution system for introducing the process gas wherein the gas injectors include orifices (62, 58A, 58B; Figure 11), and at least some of the orifices orientating the process gas along an axis of injection which intersects an exposed surface of the substrate at an acute angle – column 10, lines 28-42;

Claims 60-62, 68, 69, 70 – Suzuki further teaches a process gas distribution system for introducing the process gas comprising a primary (56B of 54; Figure 10, 11) and secondary gas rings (56A of 54; Figure 10, 11) that directs the process gas toward the substrate (column 10, lines 28-33) along injectors (64A,B; Figure 9; column 10, lines 10-20).

67 - Suzuki further teaches an RF bias power source (“power supply (not shown)”; column 4, lines 42-54) connected to the electrode (18, Figure 2), wherein the RF bias power source is operable to regulate a level of RF bias applied to the substrate so as to control the substrate temperature (column 4, lines 42-54).

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71 – the plurality of gas flows (from each of the injectors) overlap each other in a plane parallel to an exposed surface of the substrate (Figures 8-11)

Suzuki does not teach that all of his injectors, other than outward injectors (64B of 56B; Figure 8, 9, 11), of the process gas distribution system are spaced outwardly from the periphery of the substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to widen the radial dimension of Suzuki's process gas distribution system (54, Figure 11; column 10, lines 33-43) thereby providing all his injectors of the process gas distribution system being spaced outwardly from the periphery of the substrate.

Motivation to widen the radial dimension of Suzuki's process gas distribution system thereby providing all his injectors of the process gas distribution system being spaced outwardly from the periphery of the substrate is to improve the in-plane uniformity of the deposited film as taught by Suzuki (Figures 5,6,7a-7c; column 6, line 38 – column 7, line 60). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04).

3. Claims 59 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (U.S.Pat. 5,522,934) in view of Young et al (USPat. 5,851,294). Suzuki is discussed above. However, Suzuki does not teach that the orifice of his injectors direct the process gas in a upward direction away from the substrate. Young teaches a similar gas injection manifold (Figure 1, 4). Inclusive, Young teaches the orifice of his injectors (34, Figure 4) direct the process gas in a

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upward direction ( $\alpha$ , Figure 4; column 4, lines 1-11) away from the substrate (compare Figure 4 and Figure 1,5)

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Suzuki to optimize the angle of his injectors so the process gas is directed in a upward direction away from the substrate as taught by Young.

Motivation for Suzuki to optimize the angle of his injectors so the process gas is directed in a upward direction away from the substrate is to optimize the flow of the process gas as taught by Young (column 4, lines 1-11).

#### ***Response to Arguments***

4. Applicant's arguments filed September 10, 2003 have been fully considered but they are not persuasive.

5. Applicant, on page 4, refers to Suzuki's process gas injection holes 36A-C and additive gas injection holes 44 of Figure 2 as not meeting Applicant's claim limitations. However, the Examiner has repeatedly and accurately referenced another and completely different Suzuki embodiment as depicted in Figures 8-11 which teach Applicant's claim limitations as discussed above. The sole reference to Suzuki's Figure 2 is provided for the teaching of a common element substrate holder (6, Fig. 2, 8).

6. Applicant states on page 4 :

“

Suzuki fails to disclose or suggest any arrangement of the process gas injection holes that includes all gas injection holes spaced outwardly from the periphery of a substrate supported on a substrate holder. To the contrary, Suzuki discloses that in-plane

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“

As stated above and in the prior action, the Examiner agrees that not all of Suzuki's injectors (64B of 56B; Figure 8, 9, 11) are spaced outwardly from the periphery of a substrate supported on a substrate holder. For example, some of Suzuki's injectors (58A and 62; Figure 8, 11) are not spaced outwardly from the periphery of a substrate ("W") supported on a substrate holder (6, Figure 8). However, as Suzuki teaches in Figure 4 (column 6, lines 38-65) the relative dimensions of both the injector and/or the substrate, are quantities that are optimized for finding the best "in-plane uniformity of film formation" as taught by Suzuki. As a result, persons of ordinary skill in the art would find these relative dimensions as quantities that can be optimized to effect "in-plane uniformity of film formation" as taught by Suzuki. Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04).

7. Applicant states in page 5:

“

Furthermore, Suzuki discloses that the embodiment shown in FIG. 2 can "cope with an increase in diameter of a wafer" (col. 10, lines 7-8). In other words, Suzuki discloses that the same gas distribution system shown in FIG. 2 can be used with wafers having different diameters. Also, increasing the diameter of the wafer W shown in FIG. 8 would increase the amount of overlap of the process gas injection holes and additive gas supply paths relative to the periphery of the wafer.

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In response, it is well established that apparatus claims must be structurally distinguished from the prior art (In re Danley, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does ." (emphasis in original) Hewlett - Packard Co . v. Bausch & Lomb Inc ., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990), MPEP – 2114). Further, a claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. Exparte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

### ***Conclusion***

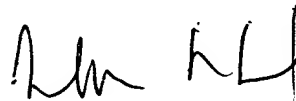
8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.



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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (703) 305-1351. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official after final fax phone number for the 1763 art unit is (703) 872-9311. The official before final fax phone number for the 1763 art unit is (703) 872-9310. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (703) 308-0661. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (703) 308-1633.

A handwritten signature in black ink, appearing to read 'Jeffrie R. Lund'.

**JEFFRIE R. LUND**  
**PRIMARY EXAMINER**